

Name: _____

Human Population Growth: Natural Increase Rate & Doubling Time

Introduction:

Birth and death rates determine the rate of population growth. If the birth and death rates are similar, a population experiences little or no growth. When the birth rate far exceeds the death rate, the population soars. These rates are expressed as the number of births or deaths for every 1,000 people in a given year. For instance, in 2007 the world's birth rate was 21 per 1,000 and the death rate was 9 per 1,000. Using the formulas below, one can determine the world's annual growth rate and the number of years it will take the population to double if the growth rate remains constant.

Intrinsic rate of natural increase = $(\text{birth rate} - \text{death rate})/10 = (21 - 9)/10 = 1.2\%$

Doubling Time (in years) = $70/(\text{rate of increase}) = 70/1.2 = 58.3$ years

(NOTE: 70 is the approximate equivalent of 100 times the natural log of 2.)

Using the table below, determine the percentage of annual increase and the population doubling times for each country.

$$\text{Percent annual natural increase} = \frac{(\text{birth rate}) - (\text{death rate})}{10}$$

$$\text{Doubling time (in years)} = \frac{70}{\text{rate of increase}}$$

Country	Birth Rate (2007)	Death Rate (2007)	Natural Increase Rate	Doubling Time
United States	14 per 1000	8 per 1000		
Kenya	40 per 1000	12 per 1000		
Mexico	21 per 1000	5 per 1000		
Bolivia	29 per 1000	8 per 1000		
India	24 per 1000	8 per 1000		
China	12 per 1000	7 per 1000		
Japan	9 per 1000	9 per 1000		
Germany	8 per 1000	10 per 1000		
Russia	10 per 1000	15 per 1000		
World	21 per 1000	9 per 1000		